

**SECTION 44 42 13**  
**POND AERATION**

**PART 1- GENERAL**

**1.01 SCOPE**

Furnish labor, materials, supplies, equipment, tools, and transportation, and perform operations in connection with and reasonably incidental to the complete installation of the aeration system and guarantee/warranty as shown on the drawings, the installation details, and as specified herein. Items of work specifically included are:

- A. Procurement of applicable licenses, permits, and fees as required by local codes and utilities.
- B. Connection of electrical power supply to the aeration system.
- C. Installation of pond aeration system and appurtenance necessary for the complete operation of the aeration system.
- D. Coordination of installation of aeration mechanical system with the installation of the pump system concrete mounting pad, conduit penetrations through slab or floor of the enclosure and beneath wall surrounding the equipment and enclosure.
- E. Testing and start-up, and adjustment of aeration systems.
- F. 30-day maintenance period.

**1.02 DISCREPANCIES**

It is the intent of these plans and specification that aeration equipment installed is complete and operational. It is the Contractor's responsibility to make sure that the equipment furnished is compatible and adheres to applicable regulations. Discrepancies should be noted immediately and should be reported to the Owner's Representative in writing for clarification.

**1.03 SUBMITTALS**

- A. Deliver one (1) pdf copy of submittals to Owner's Representative within 10 working days from date of Notice to Proceed. Furnish information with table of contents and index sheet. Index sections for different components and label with specification section number and name of component. Furnish submittals for components on material list. Indicate which items are being supplied on catalog cut sheets when multiple items are shown on one sheet. Owner's Representative. Incomplete submittals will be returned without review.
- B. Materials List: Include pipe, valves, flow meters, fittings, compressors, conduit, control system components, electrical equipment and enclosures. Quantities of materials need not be included.
- C. Manufacturers' Data: Submit manufacturers' catalog cuts, specifications, and operating and maintenance instructions for equipment supplied.
- D. Maintenance Manual: Submit three (3) copies of a bound maintenance manual that includes manufacturer's data listed above and recommended operating procedures, adjustments, system trouble shooting, and preventive maintenance procedures.
- E. Shop Drawings: Submit shop drawings of compressor system, electrical controls, and flow meter control unit installation. Show products required for proper installation, their relative locations, and critical dimensions. Note modifications to the installation drawings.

- F. Testing: Submit a proof of testing report following completion of each test listed in the Specifications or Construction Documents. Unless otherwise noted, include name of test, date of test, name of the individual completing the test, name of the company completing the test, name of Owner's Representative observing the test, and a summary of the test results. If system fails test, document retests until system passes test.

#### 1.04 RULES AND REGULATIONS

- A. Work and materials shall be in accordance with the latest edition of the International Electric Code, and the International Plumbing Code as published by the International Code Council, and applicable laws and regulations of the governing authorities.
- B. When the contract documents call for materials or construction of a better quality or larger size than required by the above-mentioned rules and regulations, provide the quality and size required by the contract documents.

#### 1.05 TESTING

- A. Notify the Owner's Representative three days (72 hours) in advance of testing.
- B. On completion of assembly, the aeration system piping shall be hydrostatically tested at a pressure not less than 25 PSI for one hour.
  - 1. Plug end of aeration tubing where aeration pod will be connected prior to testing.
  - 2. Observe pressure loss on pressure gauge. If pressure loss is greater than 5 PSI, identify reason for pressure loss. Replace defective tube/pipe, fitting, joint, valve or appurtenance. Repeat until pressure loss is equal to or less than 5 PSI.
  - 3. Visually inspect tube/pipe for leakage and replace defective tube/pipe, fitting, joint, valve or appurtenance. Repeat test until system passes test.
- C. Control and safety shut off devices shall be tested and verified operational.
- D. Flow and discharge pressure shall be verified with specified values.

#### 1.06 CONSTRUCTION REVIEWS

- A. The purpose of on-site reviews by the Owner's Representative is to observe the Contractor's interpretation of the construction documents and to address questions with regards to the aeration system.
  - 1. Scheduled reviews such as those for testing should be scheduled with the Owner's Representative as required by these specifications.
  - 2. Impromptu reviews may occur at any time during the project.
  - 3. Final Observation will occur upon request of the Contractor and prior to final acceptance. The intent is to verify that installation, testing, maintenance and operation submittals; and project record drawing submittals are completed prior to the start of the Maintenance and Guarantee/Warranty periods.
  - 4. All costs, including travel expenses and site visits by the Owner's Representative(s) for additional Inspection(s) that may be required after the Final Observation due to non-compliance with the Construction Documents are the sole responsibility of the Contractor.

## 1.07 GUARANTEE/WARRANTY AND REPLACEMENT

- A. The purpose of this guarantee/warranty is to ensure that the Owner receives materials of prime quality, installed and maintained in a thorough and careful manner.
- B. The manufacturer shall warrant the aeration system to be free of defects and product malfunctions for a period of one (1) year from date of start up. Fill and repair depressions. Restore landscape or structural features damaged by the settlement of trenches or excavations. Repair damage to the premises caused by a defective item. Make repairs within seven days of notification from the Owner's Representative.
- C. Failures caused by lightning strikes, power surges, vandalism, flooding, operator abuse, or acts of God are excluded from warranty coverage.
- D. Repair damage to the premises caused by a defective item. Make repairs within seven days of notification from the Owner's Representative.
- E. Contract documents govern replacements identically as with new work. Make replacements at no additional cost to the contract price.
- F. Guarantee/warranty applies to originally installed materials and equipment and replacements made during the guarantee/warranty period.

## PART 2- MATERIALS

### 2.01 QUALITY

Materials used in the system shall be new and without flaws or defects of any type and shall be the best of their class and kind.

### 2.02 SUBSTITUTIONS

- A. Make complete submittals of manufacturers' data showing compliance with the Contract Documents.
- B. In making a request for a substitution, the Contractor represents that they:
  - 1. Have investigated the proposed substitution and found that it is the same or better quality, level, capacity, function, or appearance than the specified product, and can demonstrate that to the Engineer.
  - 2. Will coordinate the installation and make modifications to the work which may be required for complete installation and operation of the system.
- C. The Owner's Representative and the Engineer will determine acceptability of the proposed substitution and will notify Contractor of acceptance or rejection.
- D. Pipe sizes referenced in the construction documents are minimum sizes and may be increased at the option of the Contractor.

### 2.03 GENERAL REQUIREMENTS FOR AERATION SYSTEM:

- A. The complete aeration mechanical system, and related equipment is designed to function in an outdoor desert environment. Furnish protective covers as required for proper operation of the system.
- B. The aeration system has a capacity of not less than that shown on the construction documents.
- C. Completely assemble and operate components of the aeration system prior to shipment to insure proper fit, assembly and operation on the job site.

- D. Construction must include necessary components and vibration dampeners to support components during shipping and to serve as the installed mounting base on the concrete slab.
- E. Connection of the aeration system to electrical power supply per the electrical construction documents.
- F. System components shall be supplied and be the responsibility of one manufacturer, even though some components may be manufactured by others.
- G. The aeration system and related equipment shall meet general and technical specifications; shall be designed, fabricated and installed in a workmanlike manner; and shall be delivered within schedules negotiated between Contractor and manufacturer.
- H. Furnish shop drawing for approval prior to installation.
- I. Provide a factory-trained technician to supervise the installation of the aeration system.
- J. In addition to the time required for installation supervision, the technician shall provide a minimum of four (4) hours of training for the Owner's staff in the operation and maintenance of the aeration system.
- K. Aeration system contractor must provide a two (2) year semi-annual (twice per year) maintenance servicing agreement to Owner's Representative for consideration to ensure proper operation of the system.
- L. Provide a factory-trained technician to supervise the installation of the aeration system.
- M. Acceptable Manufacturer for aeration system:  

AquaMaster Fountains and Aerators  
800-693-3144
- N. Acceptable Model: AquaAir® Ultra 12 (240V). It shall come complete with cabinet, compressors, ten (10) Single Membrane (SM) diffuser assemblies and necessary amount of weighted air supply tubing

#### 2.04 COMPRESSOR

Furnish four (4) ½-HP dual head compressors, single-phase, wobble piston built for continuous operation and equipped with thermal overload protection, pressure relief valves, and mufflers for quiet operation. They shall be oil-free and require periodic preventative maintenance after every 18 months of run time which consists of a piston replacement kit and air filters. At 5PSI the compressor shall produce 20CFM while operating at approximately 6.8 amps @ 240 VAC.

#### 2.05 COMPRESSOR CABINET

Furnish enclosure that is rectangular in design and is constructed of minimum 16-gauge stainless steel. Enclosure must be fully gasketed and equipped with padlock for security, ventilation to provide forced air circulation and an integral cooling fans with thermal protection, producing 230 CFM to guard against excessive compressor operating temperatures. Includes power cord with NEMA 6-15 plug for 240 VAC systems (15 AMP service required).

## 2.06 DIFFUSER ASSEMBLIES

- A. Must be mounted on a round, hollow chamber base constructed of linear low-density polyethylene material. Base must be capable of being filled with pea gravel for weighting. Base shall be designed with a back-flow check valve and adjustable diffuser riser capability to accommodate site requirements.
- B. Single Membrane (SM) – consists of (1) 12" diameter, self-cleaning, flexible, fluoroelastomer layered, fine bubble, EPDM membrane diffuser with 100% rebound memory. It shall provide superior resistance to fouling, calcium scaling, chemicals, fats, oils, grease, hydrocarbons, fuels and solvents. It must produce millions of fine bubbles.

## 2.07 WEIGHTED AIR SUPPLY TUBING

Self-weighted, direct burial submersible tubing for connection from compressor to diffuser assembly. Tubing must be of flexible PVC composite construction for use with standard PVC solvent weld cement and 0.5" insert fittings. 1/2" tubing shall have 0.52" ID X 1.06" OD, 5/8" tubing shall have .63" ID X 1.15" OD and both have a .27" wall thickness, for long term durability and protection against punctures. It must remain flexible in cold temperatures.

## 2.08 PVC SUPPLY PIPE TO REMOTE MANIFOLD

Use Schedule 40 PVC pipe conforming to dimensions and tolerances established by ASTM Standard D1785. Use Schedule 40, Type 1, PVC solvent weld fittings conforming to ASTM Standards D2466 and D1784. Use primer approved by pipe manufacturer. Use solvent cement conforming to ASTM Standard D2564.

## 2.09 PVC SLEEVING

Use PVC Class 200, SDR-21, rated at 200 PSI, conforming to dimensions and tolerances established by ASTM Standard D2241. Provide PVC Class 200 Fabricated or Long Sweep Fittings for directional changes. Join pipe lengths and fittings using solvent cement and primer as recommended by pipe manufacturer.

## 2.010 OTHER COMPONENTS

- A. Valve box for Remote Manifold Assembly: Provide Carson/Oldcastle Model # 1730-24 Super Jumbo Box with tan T-cover as indicated on the drawings and details.
- B. Tools and Spare Parts: Provide operating keys, servicing tools, test equipment, and any other items indicated on the drawings.
- C. Other Materials: Provide other materials or equipment shown on the drawings or installation details to be part of the aeration system, even though such items may not have been referenced in these specifications.

# PART 3- EXECUTION

## 3.01 INSPECTIONS AND REVIEWS:

Site Inspections:

1. Verify site conditions and note irregularities affecting work of this section. Report irregularities to the Owner's Representative prior to beginning work.
2. Beginning work of this section implies acceptance of existing conditions.

## 3.02 AERATION SYSTEM INSTALLATION

- A. Shipping, off-loading and the technical start up shall be furnished by the aeration system manufacturer. Location and mounting details shall be furnished to the Contractor by the aeration system manufacturer.

- B. Coordinate the installation of the aeration system with the installation of the irrigation pumping system, pond lining system, and the construction of the above ground mechanical concrete pad referenced in other sections of the specifications.
- C. Install the systems as recommended by the manufacturer and as shown in the drawings. Make connections and adjustments necessary for the proper operation of the aeration system.
- D. Component installation:
  - 1. Install aeration system as shown on plans and as recommended by the manufacturer.
  - 2. Install tubing and piping as shown on plans and as recommended by the manufacturer.
  - 3. Make connection between air distribution tubing and pond aeration diffuser modules where shown on plans and as recommended by the manufacturer.
  - 4. Install sleeving and conduit where indicated on the drawing. Coordinate the installation of the pond edge sleeves with the installation of the pond liner and seal penetrations as recommended by the manufacturer.
  - 5. Install aeration piping at a minimum depth of 24-inches when not installed in sleeving.
- E. Technical start up procedures by the aeration system manufacturer shall include the following:
  - 1. Provide detailed, written start-up procedure to Owner's Representative for review five (5) working days prior to start-up.
  - 2. System start up and pressurization of aeration piping system.
  - 3. Pressure, flow, and balance adjustments.

### 3.03 INSTALLATION OF ELECTRICAL COMPONENTS

- A. Install electrical control panels and disconnect on wall of pump station enclosure as recommended by manufacturer and as shown on drawings.
- B. Install conduit and wiring as recommended by the manufacturer and as necessary for the proper operation of the system.

### 3.04 OTHER ITEMS

- A. Tools and Spare Parts:
  - 1. Prior to the Final Review, supply to the Owner operating keys, servicing tools, test equipment, and any other items indicated on the drawings.
  - 2. Prior to Final Review, supply to the Owner one complete set gaskets for each compressor. Furnish other spare parts indicated in the General Notes on the drawings.
- B. Other Materials: Install other materials or equipment shown on the drawings or installation details to be part of the aeration system, even though such items may not have been referenced in these specifications.

### 3.05 MAINTENANCE AND OPERATION INSTRUCTIONS

#### Aeration System Maintenance:

- A. Prior to Final Inspection, provide a half-day training session to operating personnel on proper operation and maintenance of the aeration system. Training session should be scheduled for a period of not less than four (4) hours and cover aspects of maintaining, operating and repairing the new aeration system.
- B. Unless otherwise noted, provide aeration system operation and maintenance information in a 3-ring binder with table of contents and index sheet. Provide sections that are indexed and labeled. Provide the following information:
  - 1. Contact information for local service technicians, authorized to conduct field support and service on the specified equipment.
  - 2. Catalog cut sheets for aeration system.
  - 3. Manufacturer's Operation and Maintenance manuals including complete documentation for programming and recommended settings and adjustments.
  - 4. Manufacturer's Technical Service Bulletins.
  - 5. Manufacturer's Warranty Documentation.
  - 6. Manufacturer's guide for troubleshooting operational problems.
  - 7. Recommended routine maintenance inspections for weekly, monthly and annual inspections and recommended actions for the inspections and a recommended method for recording the findings of the inspections.
  - 8. Predictive schedule for component replacement.
  - 9. Operation and maintenance submittal package must be complete prior to being reviewed by the Owner's Representative. Incomplete submittals will be returned without review.

### 3.06 PROJECT RECORD (AS-BUILT) DRAWINGS

Record changes to dimensions, equipment sizes, and alignment and submit to Owner's Representative in .pdf and AutoCAD.dwg electronic format prior to final acceptance.

### 3.07 MAINTENANCE

- A. Upon completion of Final Review, maintain system for a duration of 30 calendar days.
- B. Following completion of the Contractor's maintenance period, the Owner will be responsible for maintaining the system in working order during the remainder of the guarantee/warranty period, and for performing necessary minor maintenance.

### 3.08 CLEANUP

- A. Upon completion of work, remove from the site machinery, tools, excess materials, and rubbish.
- B. Contractor shall clean surfaces and touch up scratches with factory paint to match original.

END OF SECTION